



APPROACH TO INFANT WITH DELAYED FALL OF UMBILICAL CORD

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INTRODUCTION

The umbilical cord is a bundle of vessels, normally contains two arteries and one vein buried within Wharton's jelly. It is a conduit between placenta and developing foetus, transfer materials to and from the mother and the foetus.

Umbilical Cord Management After Birth:

The cord should be clamped after birth and should be delayed for at least 60 seconds [1]. This delayed cord clamping (DCC) in full – term neonate improve haemoglobin level, iron stores and neuro development at 4 years of age [2]. The only negative outcome of DCC is polycythemia leading to hyperbilirubinemia and increase need for phototherapy. The cord should be clamped 2 to 3 cm from the abdomen and away from genitalia. It is to be routinely to inspect the cord every 15 – 30 mins for initial few hours for detection of oozing.

Care of The Cord:

It should be kept dry and clean and avoid any application. Some people prefer local antibiotic to prevent colonization (away from nappy to avoid contamination). 4% chlorhexidine application to umbilical cord is supported by some recent evidence [3]. Acceptable practice for umbilical cord care is application of topical antiseptics such as Triple Dye or Topical Antibiotics like Mupirocin, Bacitracin [4].

What is The Normal Time of Separation of Umbilical Cord?

It is 5-10 days to 3 weeks. If the separation occurs after 3 weeks then, it is called the Delayed Separation of Umbilical Cord [5].

Causes of Delayed Separation:

1. Idiopathic
2. Infection
3. Leukocyte Adhesion Deficiency (LAD) (Type – I)
4. Alloimmune Neutropenia
5. Factor XIII Deficiency
6. Urachal Abnormalities (umbilical exudates appeared soapy)

History & Clinical Examination:

For diagnosis and management of delayed fall of umbilical cord, we need three important pillars – History, Clinical Examination and Investigation. History of prolonged bleeding from umbilical stump after clamping and cutting may be associated with Factor XIII deficiency. Foul smell discharge, fever, oozing from stump indicates infection of stump (e.g. Omphalitis). Immunological abnormalities sometimes though rarely may cause infection, so refusals to suck, temperature instability, respiratory distress etc. all are to be enquired from parents or care-givers of the infant.

Investigation:

- Investigation concerning infection — CBC, CRP Blood C/S.
- Molecular genetic testing for LAD.
- USG abdomen for Urachal Anomalies.

Idiopathic:

Delayed separation of umbilical cord is there with no identifiable cause (Fig. 1). Umbilical cord is dry, clean and healthy. Etiology, pathogenesis are not known i.e. Cryptogenic. No active intervention is required.



Fig. 1: 26 days old infant with non – separated umbilical cord (Idiopathic)

Infection:

The infection may be localized to cord or life threatening invasive infection; Omphalitis to Sepsis. The incidence of Omphalitis in developed countries is 0.7% and more 6 – 8% with developing countries [6] [7] [8] [9]. Prevention of infection is important and the dry care method (keep clean and dry) is recommended by WHO [10].

National Institute of Health Care and Excellence Guidelines, American Academy of Pediatrics and Spanish Association of Pediatrics also have the same opinion to keep the umbilical cord dry and clean [11][12].

Application of antiseptic solution can cause Delayed Separation of Umbilical Cord [13]. If there is already delayed separation of umbilical cord and local infection is the cause, we suggest for dressing of the umbilical stump and application of antibiotic locally. Edema, Erythema, Serous or purulent discharge with

foul smell are associated with Omphalitis and life threatening sepsis require IPD (In Patient Department) management with intravenous antibiotics [14].

Leucocyte Adhesion Deficiency:

LAD is rare AR (Autosomal Recessive) disorder with deficit in neutrophil function due to mutation of the gene 21q 22.3 [15]. Children and infant with LAD suffer from recurrent bacterial and fungal infection and delayed umbilical cord separation. It is usually due to cord stump infection. A few neutrophils are present in infected areas with no pus formation.

Typically CBC shows Leukocytosis (WBC count $> 20 \times 10^9/L$) in the absence of infection and WBC count increase rapidly with infection ($40 - 100 \times 10^9/L$). Laboratory diagnosis of LAD is established by $\beta 2$ - integrin assessment, measurement of surface CD11 b/ CD18 in neutrophils. In LAD – 1, there is deficiency of migration, Chemotaxis, Phagocytosis and killing by neutrophil, treatment depends on severity of LAD – 1 like allogeneic hematopoietic stem cell transplantation, Uste Kimumab (IL 12 & 23 inhibitor), supportive treatments and antibiotics [15].

Alloimmune Neutropenia:

It is similar to Haemolytic disease of newborn [16]. Neonatal autoimmune Neutropenia occurs due to maternal sensitization to paternal human neutrophil antigens which are present in fetal neutrophil. The Anti HNA antibodies are IgG class, can cross placenta and causes destruction of mature fetal neutrophil. A reduced number of neutrophil may cause delayed sloughing of umbilical cord and sometimes severe infection like Omphalitis, fever of unknown origin, pneumonia and sepsis [17][18][19]. Estimation of neutrophil concentration may give rise to suspicion for further investigation. Serological investigation is there but is laborious. Most of the cases antibiotic treatment is sufficient; sometimes G – CSF may be required [20].

Factor XIII Deficiency:

Clotting factor XIII is required for cross linking of fibrin to stabilize the fibrin clot [21]. It is associated with delayed separation of the umbilical cord, poor wound healing and mild bruising. Traditional coagulation test are all normal. Clot stability test is easy inexpensive and 5(M) urea solution is used if clot is easily lyses factor XIII deficiency is confirmed [22].

Urachal Anomalies

The Urachus is a tube that connects the bladder to the umbilicus. It closes with the growth of infant. Failure to close causes leakage of urine, cyst formation, recurrent urinary tract infection. Urachal anomalies are suspected when delay sloughing of umbilical cord is associated with drainage from the umbilicus, redness, pain and urinary tract infection. Ultra sound scan can detect the anomalies. Antibiotic for control of infection followed by surgical intervention is the mainstay of treatment [23].

Umbilical Granuloma

Pink soft moist nodule of tissue seen after sloughing of stump sometime associated with delayed separation of umbilical cord is called Umbilical Granuloma (Fig. 2). It is the most common umbilical mass frequently oozes. Treatment with table salt shows 91%-100% success rate (Fig. 3) [24].

It is treated in the following ways:

Clean the granuloma area-> apply pinch of table salt-> cover the area with adhesive tapes and keep for 24 hours-> repeat the same for three days.



Fig. 2: Umbilical Granuloma before treatment



Fig. 3: Umbilical Granuloma after treatment

DISCUSSION & CONCLUSION

Delayed sloughing of umbilical cord causes anxiety to parent, care givers and also treating doctor. Doctor may get phone calls at least once a day from the parents. Another most common complication related to Belly Button and also with delayed separation of stump is umbilical granuloma as discussed before. Watchful observation, early diagnosis, proper counseling and treatment is necessary to allay anxiety and save the child from life threatening complications.

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